C.6 OAK RIDGE OPERATIONS OFFICE SUMMARY

NOTE: This site summary provides information and data for sites under the Department's Oak Ridge Operations Office. The data for this summary were collected in 1999 and do not necessarily reflect funding or completion profiles for the site. The data do not include changes that resulted from actual FY 2000 appropriations or anticipated changes as a result of both FY 2000 supplemental and FY 2001 budget requests. The Department is in the process of updating its life-cycle information for the EM program.

The 1999 data were the basis for DOE's *Status Report on Paths to Closure* (March 2000). The costs in the "Cost and Completion Date" section of this summary are the sum of the project planning baselines prepared by the field office and generally do not include estimates of project uncertainty. On the other hand, the cost range in the national status report includes an estimate of the cost resulting from project uncertainties, and EM's overall estimate of life-cycle costs of $151-195 billion from FY 2000 to FY 2070 (or $168-$215 billion if the costs incurred between FY 1997 and FY 2000 are included in the cost range estimate).

The mission of the Oak Ridge Operations Office is to oversee and manage various facilities and programs related to the Office of Nuclear Energy, Science, Uranium Enrichment, Defense Programs, and Environmental Management in Tennessee, Ohio, Kentucky, and Missouri. The largest Oak Ridge Operations Office site–the Oak Ridge Reservation located in Oak Ridge, Tennessee–has approximately 1,100 acres of unlined radioactive and mixed waste burial grounds, inactive tanks, surplus facilities, and unlined ponds. As a result, soil, surface water, groundwater, and two major rivers in the area are contaminated. To address these issues and the issues at the Paducah Gaseous Diffusion Plant, the Portsmouth Gaseous Diffusion Plant, and the Weldon Spring Site, the Oak Ridge Operations Office has developed an aggressive strategy for the accelerated completion of its Office of Environmental Management (EM) mission.

Oak Ridge Reservation

The ***Oak Ridge National Laboratory*** (ORNL) is one of the country's largest multidisciplinary and multi-program laboratories and research facilities. Weapons research facilities were established at the site of the Oak Ridge National Laboratory in 1943 as part of the World War II Manhattan Project. The laboratory's original mission was to produce and chemically separate the first quantities of plutonium as part of the national effort to produce the atomic bomb.

The ***Y-12 Plant*** was built in 1943 as part of the World War II Manhattan Project. The original mission of the Oak Ridge Y-12 Plant was uranium enrichment and nuclear weapons production. Since World War II, the role of the Y-12 Plant has evolved into supporting highly sophisticated manufacturing; development engineering associated with the production, fabrication, and dismantlement of nuclear weapons components; and serving as the national repository for enriched uranium.

The ***East Tennessee Technology Park*** (ETTP) was built as part of the World War II Manhattan Project to supply enriched uranium for nuclear weapons production. Between 1959 to 1969, the focus shifted to production of commercial-grade, low-enriched uranium. Because of the declining demand for enriched uranium, the enrichment process was placed on standby in 1985 and shut down permanently in 1987. Currently, an effort is underway to industrialize the site by leasing facilities to private companies.

Gaseous Diffusion Plants

Construction of the ***Paducah*** and ***Portsmouth Gaseous Diffusion Plants*** began in the early 1950s to expand the federal government's gaseous diffusion program, which was already in place at Oak Ridge, Tennessee. The facilities were built to increase the production of enriched uranium for defense and non-defense needs.

Environmental Management Site

The ***Weldon Spring Site*** was part of a site used by the U.S. Army as an ordnance works in the 1940s. In the 1950s and 1960s, the Atomic Energy Commission used the site to process uranium ore in the Weldon Spring Chemical Plant. The plant was subsequently deactivated until remediation began in 1985.

C.6.1 End State

The overall end state (or end use as usually referred to by the Oak Ridge Operations Office) of the sites managed by the Oak Ridge Operations Office is assumed to be a combination of controlled access, controlled industrial, recreational, and unrestricted. Oak Ridge Operations Office has considered end use recommendations developed by the Oak Ridge Reservation Site-Specific Advisory Board's End Use Working Group. Many of their recommendations have been used as assumptions for the life-cycle baseline. Actual end uses will be

identified in the appropriate decision documents. The Weldon Spring end use has been determined in a Record of Decision (ROD). Exhibit C.6-1 provides a summary of the anticipated site end uses for the Oak Ridge Operations Office.

Exhibit C.6-1
Summary of Oak Ridge Operations Office End States

Site Name	End State Description
Oak Ridge Reservation	The Oak Ridge Reservation consists of ORNL, ETTP, and the Y-12 Plant. ORNL will be remediated to allow controlled industrial use of its main plant area through soil excavation and building demolition. The other industrial areas will be remediated to unrestricted industrial use through aggressive soil removal and contaminated subsurface facility (tanks and pipeline) removal. The outlying areas in Bethel Valley will be remediated for unrestricted use through the excavation of burial grounds and contaminated soil. The burial ground area of Melton Valley will remain restricted, and contaminant migration will be controlled primarily through hydraulic isolation. The Y-12 Plant will be controlled industrial use with near-term remediation focusing on soil and sediment removal to control the migration of contaminants. The Y-12 Plant burial grounds will remain restricted, again with the use of hydraulic isolation. Areas near the burial grounds will be considered unrestricted industrial or recreational. Portions of Chestnut Ridge will be restricted since waste will be closed in place. ETTP actions consist of soil and sediment remediation and burial ground excavation to allow unrestricted industrial use. Buildings will be demolished if there is no future use or re-used. Sites off the reservation will be remediated for unrestricted use. The exception is restrictions on fishing and dredging in the contaminated off-site surface water bodies.
Paducah Gaseous Diffusion Plant	End use will be restricted industrial, open space/recreational, and controlled access. Several landfills or burial grounds will be closed with contamination remaining in place in the industrial area. Facilities will be cleaned for release or re-use, with deed restrictions or use limitations for areas with residual contamination.
Portsmouth Gaseous Diffusion Plant	End use will be restricted industrial, open space/recreational, and controlled access. Major sources of on-site contamination will be contained and/or remediated. Reindustrialization of existing DOE facilities is a possibility with deed restrictions or land-use limitations on areas with contamination remaining in place. Several landfills or burial grounds will be closed with contamination remaining in place.

Exhibit C.6-1
Summary of Oak Ridge Operations Office End States

Site Name	End State Description
Weldon Spring Site	The end state includes a permanent onsite 62-acre disposal cell. The remaining 155 acres of the Chemical Plant site will be released to the appropriate agency for unrestricted uses, and the nine-acre quarry will be released for recreational use. The disposal cell will remain restricted.

C.6.2 Cost and Completion Dates

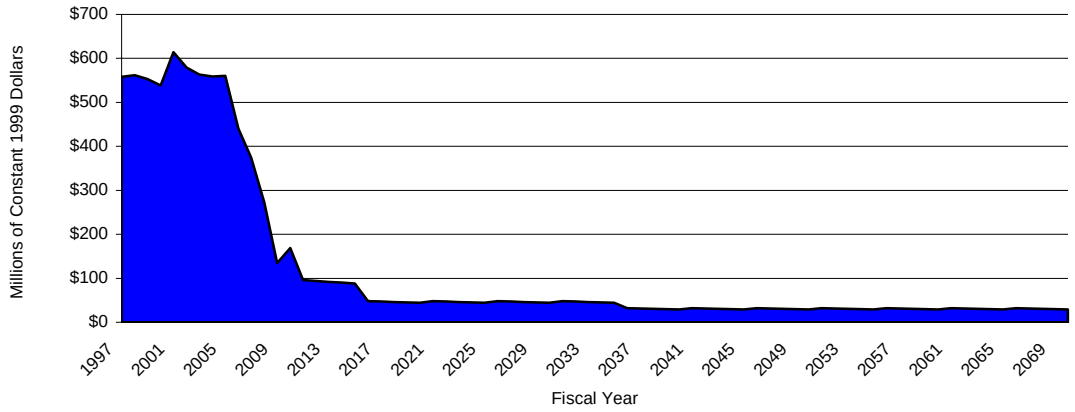
Oak Ridge Operations Office has divided its environmental management work into 41 discrete projects, including seven PBSs with carry-over funding. A PBS exists for each project and contains detailed programmatic information, including cost, schedule, scope, end state, and interim milestones. For additional information about these projects, see the PBSs.

The sum of the costs of the planning baselines for individual projects managed by the Oak Ridge Operations Office was $8.9 billion (constant 1999 dollars). The overall completion dates are:

Site	Date
Oak Ridge Reservation	2014
Paducah Gaseous Diffusion Plant	2012
Portsmouth Gaseous Diffusion Plant	2013
Weldon Spring Site	2002

The projected cost profile for environmental management associated with the Oak Ridge Operations Office was developed by combining the cost estimates in each of the PBSs. Exhibit C.6-2 displays the resultant baseline cost profile.

Exhibit C.6-2
Oak Ridge Operations Office
Environmental Management Baseline Cost Profile



C.6.3 Accomplishments Since the 1998 *Paths to Closure* Report

The Oak Ridge Operations Office made significant progress since the 1998 *Paths to Closure* report including:

- Completed the Peter Kiewit Landfill remediation and the sanitary landfill at Portsmouth ahead of schedule and below the estimate;
- Finished the excavation of the pit and the demolition of the Chemical Stabilization Plant ahead of schedule at Weldon Spring;
- Deployed a pretreatment "system" of three innovative technologies to successfully remove approximately 33,000 gallons of liquid high-level waste;
- Shipped more than 1,400,000 kg of unstabilized pond waste for off-site treatment and disposal;
- Treated and disposed 3,800,000 kg of mixed waste;
- Placed a total of approximately 480,000 cubic meters of waste in the on-site disposal facility at Weldon Spring;
- Completed the field work for remediation at U.S. Army Properties 1, 2, 3, and 5 and MDC properties 3, 4, 5, and 10 at Weldon Spring;
- Removed deposits from the ETTP Process building fulfilling a commitment made in response to a Defense Nuclear Facilities Safety Board 94-1 recommendation;
- Demolished Buildings K-724 and 725 at ETTP;

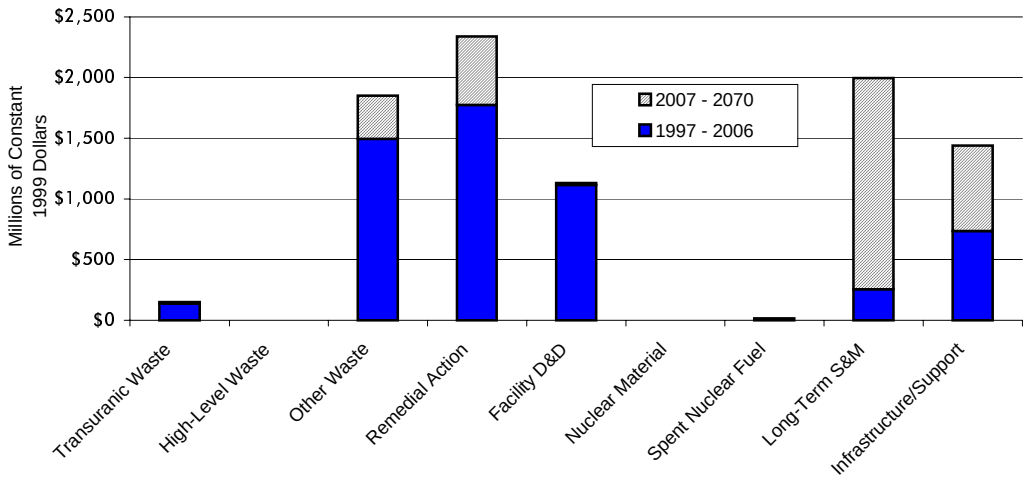
- Awarded the Transuranic Waste Treatment contract using privatization funds;
- Completed the first low-level waste shipment for off-site disposal;
- Awarded the Broad Spectrum contract for mixed low-level waste;
- Received the final signature on the ROD for the Paducah Waste Area Groups 1 and 7, including C-746-K inactive landfills; and
- Completed the Y-12 firing range and Basin 9822 remediation.

C.6.4 Work Scope Summary

The scope of work at the Oak Ridge Operations Office encompasses the Oak Ridge Reservation, Portsmouth and Paducah Gaseous Diffusion Plants, and the Weldon Spring Site. Activities include the deactivation and decommissioning of facilities, the cleanup of release sites, and the treatment and disposal of waste. More information about work scope can be found at the following websites, which contain links to the conceptual summary disposition maps (http://emi-web.inel.gov/summary.html) and the detailed disposition maps (http://emi-web.inel.gov/dmaps.html) in PDF format.

The sum of life-cycle costs at the Oak Ridge Operations Office is illustrated in Exhibit C.6-3, broken out by major work scope category.

Exhibit C.6-3
Oak Ridge Operations Office
Life-Cycle Costs by Category for the Low End of Range Estimate



C.6.5 Critical Closure Path and Programmatic Risk

The critical closure path schedules presented as Exhibit C.6-4 sets forth the duration and sequence for completing the closure activities at the Oak Ridge Operations Office. Highlighted activities show the critical closure path, which represents the series of events that drive the overall completion dates for the sites.

Completion of the EM mission at the Oak Ridge Operations Office, as scheduled, depends on the timely accomplishment of critical activities and milestones. Programmatic risk scores have been assigned to each of the critical activities/milestones. Exhibit C.6-5 presents a summary of activities/milestones on the critical closure path that have high programmatic risk (programmatic risk scores of 4 or 5 in any category). Exhibit C.6-6 displays a summary of waste disposition data that have high programmatic risk (programmatic risk scores of 4 or 5 in any category). For cleanup activities, the major uncertainty is in the definition of work scope. For the purpose of establishing a life cycle, scope assumptions are made and may change after approval of decision documents. For certain waste management activities, disposal location is uncertain, which results in high programmatic risk. High programmatic risk will decrease after disposal agreements are reached and cleanup decisions are made.

Exhibit C.6-4a
Oak Ridge Operations Office
East Tennessee Technology Park Critical Closure Path

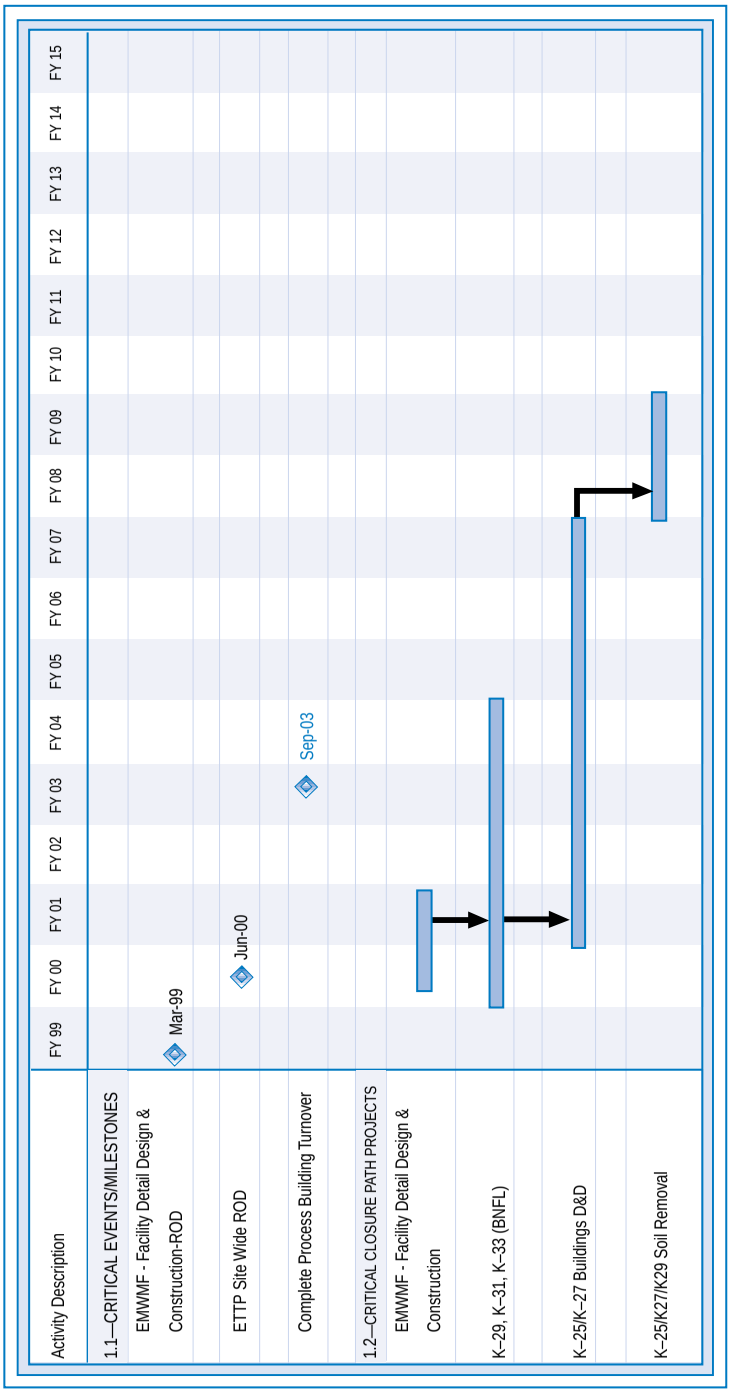


Exhibit C.6-4b
Oak Ridge Operations Office
Oak Ridge National Laboratory Critical Closure Path

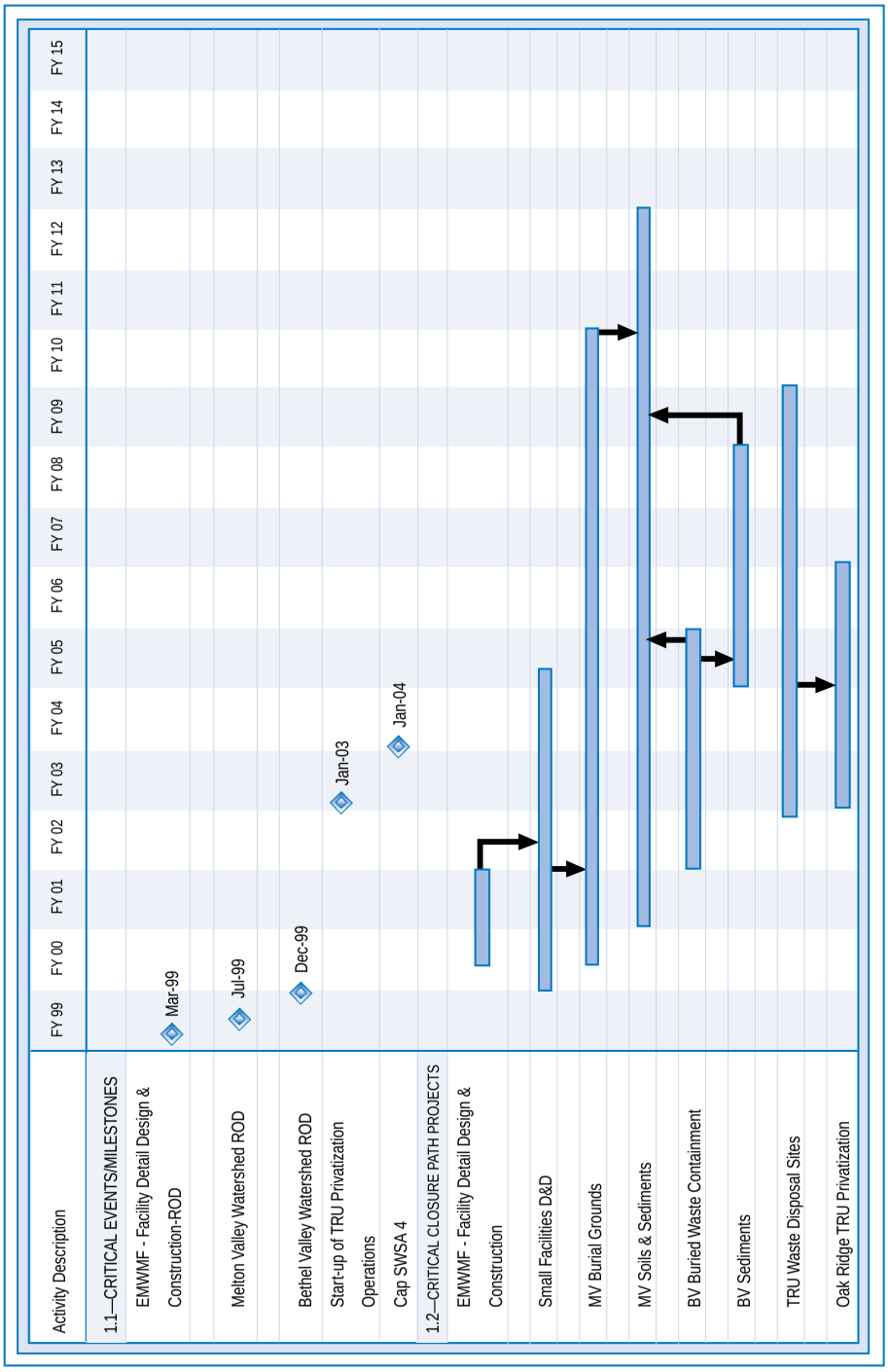


Exhibit C.6-4c
Oak Ridge Operations Office
Y-12 Critical Closure Path

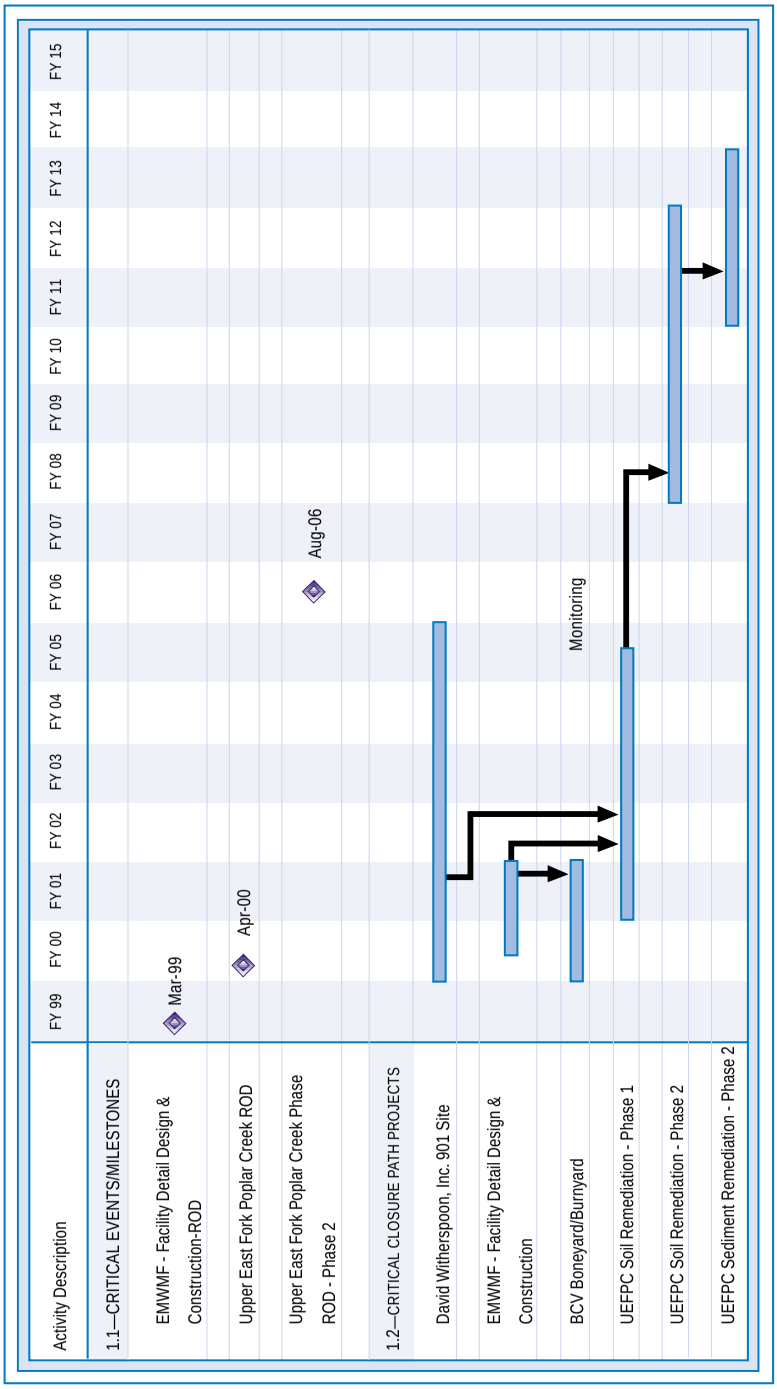


Exhibit C.6-4d
Oak Ridge Operations Office
Paducah Gaseous Diffusion Plant Critical Closure Path

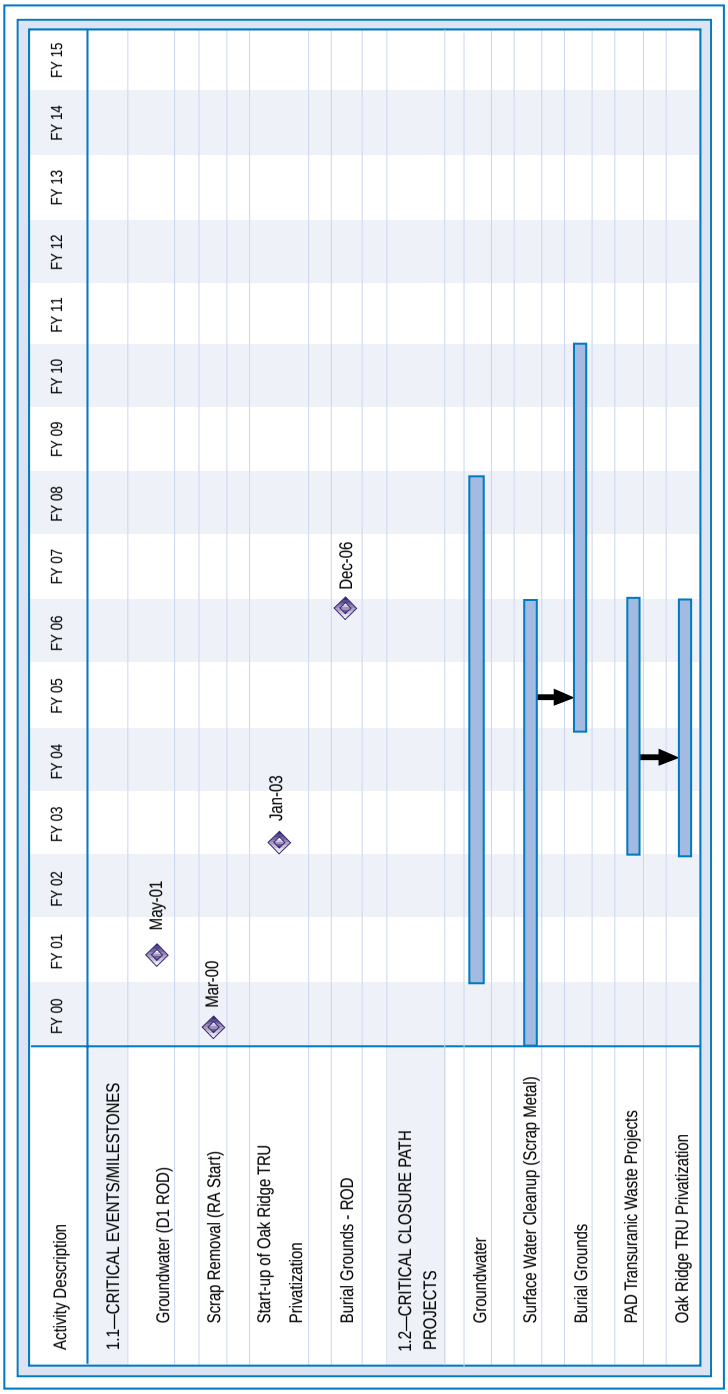


Exhibit C.6-4e
Oak Ridge Operations Office
Portsmouth Gaseous Diffusion Plant Critical Closure Path

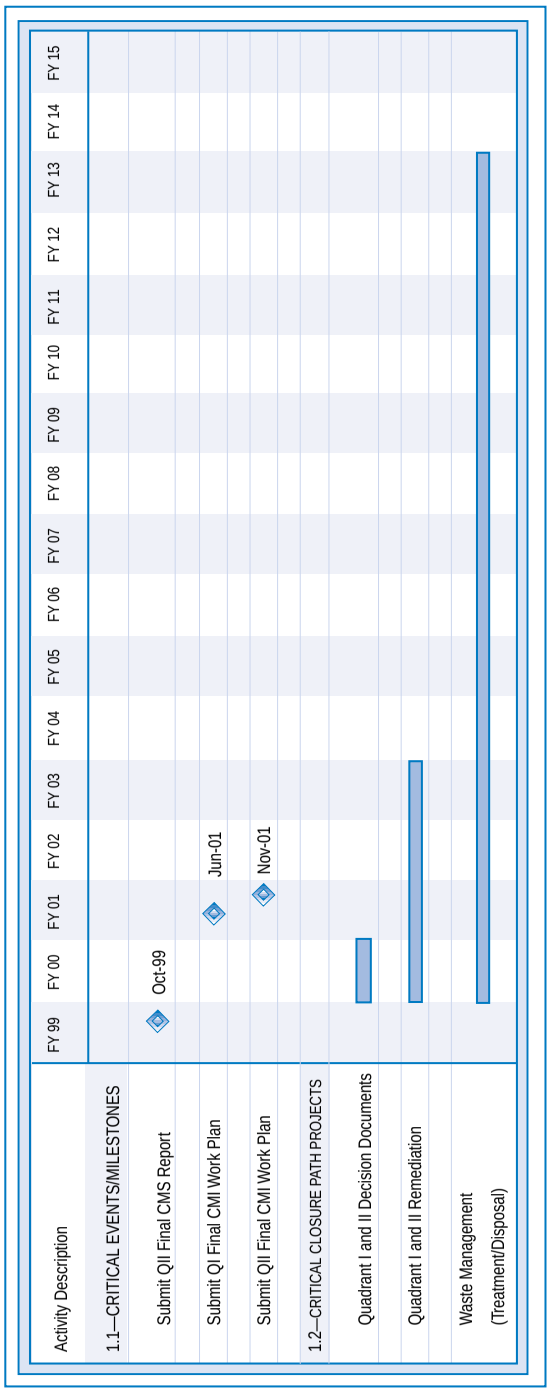


Exhibit C.6-5
Oak Ridge Operations Office
Summary of High Programmatic Risk Milestones

Site	Project, Action, Event	Dates	Programmatic Risk Categories*		
			Technological	Work Scope Definition	Intersite Dependency
Paducah Gaseous Diffusion Plant	Scrap Removal (Remedial Action Start)	March 2000	4	4	3
Oak Ridge Reservation	Environmental Management Waste Management Facility - Submit Draft Record of Decision to Regulators for Review	March 1999	4	1	1
	ETTP Site-Wide Record of Decision - Issue ROD to Regulators for Review	June 2000	4	1	1
	Start-up of TRU Privatization Operations	January 2003	3	3	4

*For a discussion of programmatic risk categories, see Appendix D on the Internet site http://www.em.doe/closure/.

Exhibit C.6-6
Oak Ridge Operations Office
Summary of High Programmatic Risk Waste Disposition Data

Site	Stream Name	Waste Stream Activity Name	Programmatic Risk Categories*		
			Technological	Work Scope Definition	Intersite Dependency
Portsmouth Gaseous Diffusion Plant	Mixed Waste	Generation	1	5	1
	Mixed Waste Solutions/ Residues	Generation	1	5	1
	Remedial Action-Hazardous Construction Debris/Metal/ Other Solids	Treatment/ Disposal	1	5	1
	Remedial Action-Hazardous-Soil/ Sediment/Sludge	Treatment/ Disposal	1	5	1
	Remedial Action (RA)-Mixed Low-Level Waste (MLLW) - Construction Debris/Metal/ Other Solids	Treatment/ Disposal	1	5	1
	RA-MLLW-Soil/ Sediment/Sludge	Treatment/ Disposal	1	5	1
	Scrap Metal (SM)-Hazardous (HAZ)-Construction Debris/Metal/ Other Solids	Treatment/ Disposal	1	5	1
	SM-HAZ-Soil/ Sediment/ Sludge	Treatment/ Disposal	1	5	1
	SM-MLLW-Construction Debris/Metal/ Other Solids	Treatment/ Disposal	1	5	1

Exhibit C.6-6
Oak Ridge Operations Office
Summary of High Programmatic Risk Waste Disposition Data

Site	Stream Name	Waste Stream Activity Name	Programmatic Risk Categories*		
			Technological	Work Scope Definition	Intersite Dependency
Oak Ridge Reservation	Treated Remote Handled (RH)-TRU Solid Debris	Disposal	1	5	1
	Treated RH-TRU Sludges	Disposal	1	5	1
	Recontamination Equipment Decontamination Cell Pretreatment RH Waste - Curium Targets	Disposal	5	1	1
	REDC Pretreatment RH Waste - MK 42 Targets	Disposal	5	5	1
	Certified CH-TRU Debris > FY2005	Disposal	5	3	1
	Certified RH-TRU > FY2007	Disposal	5	5	1
	RH Post-Treatment	Disposal	1	4	4
	X-RA-TRU-Debris	Treatment	3	3	5

*For a discussion of programmatic risk categories, see Appendix D on the Internet site http://www.em.doe/closure/.